Chapter 12

Exponents and Powers

Laws of exponents:

If ‘a’ and ‘b are any two non – zero rational numbers and m, n are positive integers, then

Law (1): Product law

$a^m . a^n = a^{m+n}$

Example:

- $x^3.x^2 = x^{3+2} = x^5$
- $x^4.x^3 = x^{4+3} = x^7$

Law (2): Quotient law or Division law

$$a^m \div a^n = \frac{a^m}{a^n} = a^{m-n} \quad (m>n)$$

$= 1 \ (m = n)$

$$= = \frac{1}{a^{n-m}} \quad (m<n)$$

Example:

- $\frac{x^5}{x^3} = x^{5-3} \ (m > n) = x^2$
- $\frac{x^4}{x^4} = 1 (m = n)$
- $\frac{x^2}{x^4} = \frac{1}{x^{4-2}} \ (m < n) = \frac{1}{x^2}$

Law (3): Involution law or Power law

$(a^m)^n = a^{mn}$

Example:

- $(x^2)^3 = x^{2 \times 3} = x^6$
- $(x^3)^4 = x^{3 \times 4} = x^{12}$